International Journal of Agricultural Science and Research(IJASR)
ISSN(P): 2250-0057; ISSN(E): 2321-0087
Vol. 5, Issue 4, Aug 2015, 363-368

ECONOMICS PERFORMANCE OF CHILLI (CAPSICUM ANNUUM L.) CULTIVATION IN RAIGARH DISTRICT OF CHHATTISGARH STATE

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ABSTRACT

The present study examines the economics performance of chilli cultivation in Raigarh district of Chhattisgarh state. The survey for this purpose was conducted in two blocks i.e. Dharamjaygarh and Pusour block of Raigarh district. Primary data were collected from 110 farmers from 11 villages of these two selected blocks through personal interview method with the help of a pre- structural schedule for the crop year 2013-14. The simple mean and average methods was used to calculate the cost of cultivation. Study revealed that average cost of cultivation of chilli was estimated as Rs. 122935.62 per hectare and observed highest i.e. Rs. 130302.58 per hectare at small farms. The yield of green chilli was observed 95.81 quintal per hectare, 107.11 quintal per hectare, 123.50 quintal per hectare and 141.31 quintal per hectare at marginal, small, medium and large farms respectively along with 117.40 quintal per hectare on an average. The gross return from chilli crop was observed as Rs. 257072.66 per hectare across the farms. The net return from this crop was calculated as Rs. 127451.60 per hectare while farms are spent on an average of Rs. 1047.15 for produce the one quintal of chilli. The average ratio of input-output was estimated as 1:2.04 across the different farms of district which shows cultivation is profitable to the farms of the district. The average use of human labour was estimated as about 521 labour days per hectare. Problem of insect- pest and diseases, lack of soil testing facilities and scarcity of labour are the some major problems which were faced by the farmers during production of chilli crop are observed in the district.

KEYWORDS: Cost of Cultivation, Production, Economics and Production Constraints

INTRODUCTION

Chilli (*Capsicum annuum* L.*)* is one of the most valuable crops of India which belongs to the solanaceae family. It is grown almost throughout the country. There are more than 400 different varieties of chillies found all over the world. Chilli is an indispensable condiment of every Indian household. It is used in a number of activities such as vegetables, spice, condiments, sauce, pickles and chutneys for culinary purposes. Chilli occupies an important place in Indian diet and it is consumed daily as condiment in one or the other form. Green chillies are rich in Vitamin A and C, minerals and protein. Dry chillies are also rich in Vitamin A and D. The world area and production of chilli is around 19.89 million hectare and 33.52 million tonnes respectively. Major chilli growing countries are India, Myanmar, Bangladesh, Pakistan, Thailand, Vietnam, Romania, China, Nigeria and Mexico etc. The bulk share of chilli production is with Asian countries. The largest producer of chillies in the world is India accounting for 13 million tonnes of production annually followed by China with a production of around 3 million tonnes. Out of the total (33.52 million tonnes) world chilli production, 38.78 percent is contributed by India followed by China (8.65 percent). India also leads in the context of maximum area covered under chilli cultivation (F.A.O. 2012). In India, chillies are grown in almost all states of the country and the major growing

states in terms of production are Andhra Pradesh (52.53 percent), Karnataka (8.20 percent), West Bengal (7.67 percent), Madhya Pradesh (7.17 percent), Odisha (5.37 percent), Gujarat (5.25 percent), and Maharashtra (3.50 percent) which constitutes more than 90 percent of the total production of chilli in the country. The average productivity in the country is around 1.64 metric tonnes per hectare. (Indian horticulture database 2013).

Chilli is the important vegetable, spice crop of the Chhattisgarh state with area and production of 5460 hectare and 8300 tonnes respectively and productivity 1.52 metric tonnes per hectare during 2012-13 (Indian horticulture database 2013). Production of chillies plays an important role in improving the economic conditions of farmer's specially marginal and small farmers at one side and help to meet out the nutritional requirements of the people on the others side. The present study was undertaken to analyse economics and constraints of chilli cultivation in Raigarh district of Chhattisgarh state.

METHODOLOGY

The present study pertains to Raigarh district of Chhattisgarh state. To accomplish the objective of the study two blocks of the district, namely Dharamjaygarh and Pusoar block were purposively selected. Accordingly eleven villages were selected randomly from these two blocks for the study. From each of the selected villages, ten number of chilli growers i.e. 110 chilli growers were considered for the present study. The Primary data were collected from the farmers through personal interview with the help of well prepared schedule and questionnaire. These farmers were classified into different categories based on their land holding i.e. marginal (up to 1.00 ha), small (1.01 ha to 2.00 ha), medium (2.01 ha to 4.00 ha) and large (above 4.00 ha) farmers. The whole information is related to the crop year 2013-2014.

RESULTS AND DISCUSSIONS

Cost of Cultivation of Chilli at Different Sample Farms

Cost of cultivation of chilli at different farms is presented in Table 1. It is clear from the table that variable cost and fixed cost constituted 89.35 percent and 10.65 percent respectively of the total cost of cultivation. On an average farmer incurred a total cost of cultivation of Rs. 122935.62 per hectare. It varied from Rs. 105297.59 per hectare at large farms to Rs. 130302.58 per hectare at small farms. It was observed from the table that, picking of chilli crop is the costly operation on which producers spent 25.00 percent of the total cost of cultivation. Looking to the figures given in the table that farmers of large category spent about 43 percent (Rs. 13183.90 per hectare) less cost on this operation to the average cost estimated across the farms for this operation (Rs. 30733.16 per hectare) maximum farmers of this category performed this operation on contractual basis at the rate of Rs. 2 per kg and consequently they spent less cost on this operation comparatively the other farmers of the area. The second important costly operation was observed manures and fertilizers constituted 13.50 percent (Rs. 16599.12 per hectare) of the total cost of cultivation. It ranges from Rs. 15649.71 per hectare at small farms to Rs. 18706.25 per hectare at large farms. Plant protection chemicals is another operation on which farmers spent on an average of Rs. 13357.70 per hectare constituted 10.87 percent of the total cost of contribution across the different farms. Farmers of large category incurred about 40 to 50 percent less cost (Rs. 8197.59 per hectare) in this operation as compared to farmers of medium, small and marginal farms in the district. More area under cultivation of this crop reduces the expenditure and increases the economies of scale of labour, seems to be an important reason behind this fact as perceived by the farmers.

The other operations like manual intercultural operation, earthing up, application of chemicals, application of manures & fertilizers and seed are the some important operation in the chilli cultivation which accounts about 4 to 6

percent of the total cost of cultivation across the farms. It is evident from the figures that cost of cultivation is decreasing as the size of holding increased except few exceptions in the districts which show that farmers are achieving economics of scale in cultivation of this crop.

Table 1: Cost of Chilli Cultivation by the Sample Farmers of Different Size Group in the Study Areas (Rs/Hectare)

S. No.	Particulars	Size Group of Chilli Growers				Average
	Cost	Marginal	Small	Medium	Large	
A.	**Variable Cost**					
1	Nursery Raising	374.99	325.50	310.88	177.65	296.46 (0.24)
	Seed	3048.59	5225.99	6560.15	6247.07	5395.72 (4.39)
2	Field preparation					
	Ploughing	2305.15	2064.15	2668.42	5602.01	3113.37 (2.53)
	Bund formation	3573.57	3132.65	2540.40	1616.85	2701.03 (2.20)
3.	Manure & fertilizer	16665.65	15649.71	15736.85	18706.25	16599.12(13.50)
	Plant protection chemicals	12469.96	15464.30	16234.10	8197.59	13357.79(10.87)
4.	Transplanting	2987.33	2799.67	2654.97	2377.16	2697.87 (2.19)
5.	Micronutrient & growth hormones	1486.86	1233.44	1286.42	1269.54	1307.11 (1.06)
6.	Irrigation	3467.18	3546.91	3489.90	3969.71	3615.35(2.94)
7.	Intercultural operation					
	Manual	9815.51	9172.60	7461.59	4891.66	7822.68 (6.36)
	Weedicides	1471.64	1348.84	1740.64	3696.20	2035.09 (1.66)
8.	Earthing up	11558.68	10274.34	8113.24	2096.80	8008.94 (6.51)
9.	Application of chemical	7043.23	6584.23	6093.60	3988.19	5928.61(4.82)
	Application of manure & fertilizer	3996.45	3676.32	3355.85	4649.70	3883.02(3.16)
10.	Picking	35279.00	37224.50	35684.80	13183.90	30733.16(25.00)
11.	Others	-	-	-	9951.61	2352.20(1.91)
	Sub total	**115543.79**	**117723.20**	**113931.80**	**90621.89**	**109847.52(89.35)**
B.	**Fixed Cost**					
1.	Rental value of land	9106.00	9035.74	9194.26	11945.04	9780.68 (7.96)
2.	Interest on working capital (6 % for one year)	3466.31	3531.69	3417.95	2718.66	3295.42 (2.68)
3.	Land revenue	12.00	12.00	12.00	12.00	12.00 (0.01)
	Sub total	**12584.31**	**12579.43**	**12624.21**	**14675.70**	**13088.10(10.65)**
C.	**Total cost (A+ B)**	**128128.10**	**130302.58**	**126556.02**	**105297.59**	**122935.62 (100.00)**

Note- Figures in the Parentheses Indicate Percentages to the Total Cost.

Economics of Chilli Cultivation at Sample Farms:

Economics of chilli cultivation at sample farms is presented in Table 2. It is observed from the table that average yield of chilli (green) was estimated as 117.40 quintal per hectare and it ranges from 95.81 quintal per hectare at marginal farms to 141.31 quintal per hectare at large farms. It shows that the yield of chillies increasing as the increase of farms size. In case of red chilli, this figures observed 0.22 quintal, 0.90 quintal and 3.07 quintal at small, medium and large farms with an average of 1.04 quintal per hectare. However, the marginal farms do not take red chilli due to less area under and

production of this crop. The average price of produce (green chilli) was observed as Rs. 2132.77 per quintal and varied from Rs. 2047.83 per quintal at large farms to Rs. 2355.33 per quintal. Price received from red chilli was observed Rs. 6428.33 per quintal across the farms. Larger farms received more than 36 to 38 percent of the total gross return as compared to marginal and small farms. Due to more yields and less cost of cultivation at this farm seems be a reason behind this facts. The average figure of gross return was estimated as Rs. 257072.66 per hectare. Similarly the net return from this crop was also more at large farms. The average figure of net returns was calculated as Rs. 127451.60 per hectare. Cost of production of chilli for one quintal was observed as Rs. 1047.15 and it was observed highest at marginal farms (Rs. 1337.31 per quintal) while it was about 45 percent less at large farms. i.e. 745.15 quintal. The average input-output ratio was estimated as 1:2.04 which was varied from 1: 1.76 at marginal farms to 1:2.75 at large farms which shows the chilli cultivation is much more profitable at large farms as compared to marginal and small farms in the district.

Table 2: Economics of Chilli Production at Sampled Farms (Rs. /Hectare)

S. No.	Particular	Marginal	Small	Medium	Large	Average
1.	**Average Yield (Qtl/Ha)**					
	Green chilli	95.81	107.11	123.50	141.31	117.40
	Red chilli	-	0.22	0.90	3.07	1.04
2.	**Average price (Rs./qtl)**					
	Green chilli	2355.33	2300.13	2350.99	2047.83	2132.77
	Red chilli	-	7925.93	7277.17	6072.16	6428.33
	Gross returns from green chilli	225664.17	246366.92	290347.26	289378.86	250387.20
	Returns from red chilli	-	1743.70	6549.45	18641.53	6685.46
3.	Gross returns (Rs./ha)	225664.17	248110.62	296896.71	308020.39	257072.66
4.	Cost of cultivation(Rs./ha)	128128.10	130302.58	126556.02	105297.59	122935.62
5.	Net returns (Rs./ha)	97536.07	116064.30	163791.20	184081.30	127451.60
6.	Cost of production (Rs./qtl)	1337.31	1216.53	1024.75	745.15	1047.15
7.	Input- output ratio	1:1.76	1:1.89	1:2.29	1:2.75	1:2.04

Operation Wise Labour Utilization of Chilli Crop at Sampled Farms

The operation wise use of human labour at marginal, small, medium and large farms in chilli cultivation is presented in Table 3. Among the different operations picking of chilli, intercultural and earthing up were more labour consuming operations in chilli cultivation at all categories of farms. The overall maximum labour employed was found in picking operation (51.91 percent) followed by intercultural (14.47 percent) and earthing up (9.09 percent) across the categories of farms. Plant protection chemical application, manures and fertilizers application, transplanting and bund formation were also important operations which combinedly constitute about 23 percent of the total labour employed in chilli cultivation. The female contribution was quite enough in chilli cultivation. The percentage contribution of female labours was estimated as 74.86 percent, 79.83 percent, 80.98 percent and 74.32 percent at marginal, small, medium and large farms respectively. Some of the operations like plant protection chemical application, weedicide application and irrigation were performed by male labours only. The per hectare use of human labour was observed as about 629.94 labour days at marginal, 647.90 labour days at small, 574.49 labour days at medium and 286.92 labour days at large farms. These figures indicate that the use of human labour was decreasing as the size of holding increased except marginal farms. Larger farmers were using more machine power and achieving economics of scale in production. The average use of human labour was estimated as about 521 labour days per hectare of which about 25 percent and 75 percent male and female labour were used in the cultivation of chilli crop respectively.

Constraints Faced by Farmers in Cultivation of Chilli At Sample Farms:

The chilli production in the study areas is profitable, there are several constraints responsible for lower yield at the farmer's field. The major problems faced by the farmers in the production of chillies in study area are presented in Table 4. Several attacks of insect- pest and diseases were the most important problem felt by 81.82 percent of the chilli growers. Another important aspect perceived by about 76 percent farmers is imbalance use of fertilizers and pesticide at all categories of farms. Lack of latest technical know-how may be a reason for this imbalanced use of fertilizers and pesticide. Therefore it is needed that the department of agriculture should arrange periodically training programmes to aware the farmers about balanced use of fertilizers, pesticide and other technical knowledge. Problem felt by 63.64 percent farmers is lack of sufficient soil testing facilities. Farmers perceived that the soil testing equipments should be available at least at block level. Scarcity of labour and lack of institutional support for chilli cultivation in the area were some others problems felt by about 45 to 55 percent of the facts in the area.

Table 3: Operation –Wise Human Labour Utilization of Chilli Crop at Sampled Farms (Labour Days /Hectare)

S. No.	Operations	Marginal Farms		Small Farms		Medium Farms		Large Farms		Average	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1	Nursery raising	2.75	-	2.48	-	2.32	-	1.00	-	2.14	-
2	Field preparation				-		-		-		
	a. Ploughing	2.80	-	2.50	-	1.10	-	0.17	-	1.61	-
	b. Bund formation	18.64	8.86	15.73	9.60	11.26	9.05	7.11	5.72	13.06	8.38
3	Manure & fertilizer application	22.00	8.56	18.04	11.75	13.02	14.13	18.31	18.94	17.53	13.72
4	Transplanting	-	25.67	-	25.17	-	23.29	-	20.67	-	23.69
5	Irrigation	4.28	-	4.64	-	3.31	-	1.28	-	3.41	-
6	Intercultural operation										
	Manual	-	84.35	-	82.45	-	65.45	-	42.54	-	68.76
	Weedicide application	6.42	-	4.14	-	6.51	-	9.88	-	6.60	-
7	Earthing up	49.82	40.95	32.95	53.48	26.27	40.29	6.40	10.72	18.26	29.08
8	PPC application	51.65	-	50.17	-	45.47	-	29.54	-	44.31	-
9	Picking	-	303.19	-	334.60	-	313.02	-	114.64	-	270.44
	Total	158.36 (25.14)	471.58 (74.86)	130.65 (20.17)	517.05 (79.83)	109.26 (19.02)	465.23 (80.98)	73.69 (25.68)	213.23 (74.32)	106.92 (20.52)	414.07 (79.48)

Note: Figures in the Parentheses Indicate Percentage to the Total use of Human Labour Days

Table 4: Constraints to Chilli Cultivation in the Study Areas

S. No.	Particulars	No. of Farmers N= 110	Percentage of Total No. of Farmers
A.	**Production problems**		
1.	Problem of insect- pest and diseases	90	81.82
2.	Imbalance use of fertilizer & pesticide	84	76.36
3.	Lack of soil testing facility	70	63.64
4.	Scarcity of labour	60	54.55
5.	Lack of institutional support	50	45.45
6.	Lack of latest technical know-how about chilli production	24	21.82

CONCLUSIONS

The area under chilli crop increased with an increase in the size of holding. It was concluded that the large farms in 20.19 percent to 23.75 percent less cost as compared to marginal, small and medium farms which shows that as the area under chilli is increasing the per hectare cost of cultivation is decreasing. The average yield and gross returns per hectare increased with the increase in size of farms. The cultivation of chilli was labour intensive therefore it is a needed to bring mechanization in the production and post harvest management of chilli. There is a need to organize the training programmes to increase the awareness among the farmers to use balanced doses of fertilizers and pesticides.

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